

BMW GROUP PLANT DINGOLFING.

FLEXIBLE. EFFICIENT. SUSTAINABLE.

**BMW
GROUP**

Plant Dingolfing





An aerial photograph showing the BMW Dingolfing plant, a large industrial complex with numerous parking lots filled with cars, surrounded by green fields and some residential areas in the distance.

OUR STRENGTH: TO MANAGE COMPLEX VARIETY FLEXIBLY AND EFFICIENTLY.

The BMW Group's Dingolfing plant produces about 1,600 top-quality cars daily, amounting to a total of around 360,000 in 2015. Thanks to the great expertise of the site's approx. 17,500 employees and 800 trainees, the efficient application of state-of-the-art technologies and materials as well as highly flexible structures and procedures, the plant situated in Lower Bavaria is ideally suited to the production of a variety of supreme model series.

The model range of BMW Group Plant Dingolfing comprises the BMW 5, 6 and 7 Series as well as, since 2013, the BMW 3 Series Gran Turismo and, since 2014, the BMW 4 Series Gran Coupé. The new BMW 7 Series, the BMW Group's flagship model and carrier of highly innovative automotive technologies, has rolled off the Dingolfing assembly lines since 2015.

The plant manages the great complexity of five model series, 15 models and over 60 drivetrain variants by applying its strengths: maximum flexibility and efficiency.

Consequently, over the past months and years, the plant has optimized its warehouse and logistics structures with regard to accommodating an increasing number of variants and part numbers; has invested in future technologies, in particular in electrification as well as composite structures and lightweight construction; and has made use of the potential offered by digitization.

The BMW Group is making serious investments to ensure the long-term future viability and competitiveness of the Dingolfing plant: for 2015 and 2016, total investment in flexible and efficient production technologies and structures amounts to several hundred million euros each. The BMW Group continues to consider Germany the heart of its production network – despite the company's 30 production and assembly sites in 14 countries worldwide, including China, the USA, South Africa, South America, and Europe.

BMW GROUP PLANT DINGOLFING – FINDING SUCCESS IN CONSTANT CHANGE.



BMW Group Plant Dingolfing has more than 40 years of experience in manufacturing premium automobiles. More than nine million BMW vehicles have been produced at the Dingolfing site so far – every one of them with the ambition in mind to deliver only absolutely perfect cars from the plant to the customer.

However, the Bavarian plant is more than just a car factory. It also produces chassis and drive parts as well as eDrive components, such as the high-voltage battery, e-transmission and aluminum chassis for the BMW i3. In addition, Dingolfing is home to the plant engineering unit, a parts distribution center as well as a separate body-in-white line for the Rolls-Royce models.

In keeping with its 'evolution and revolution' approach, the BMW Group is consistently aligning its Dingolfing site with future technologies. One example: Thanks to the innovative lightweight construction concept and the mix of materials involving steel, aluminum and carbon-fiber reinforced plastics (CFRP) in the body structure – the so-called 'Carbon Core' – the plant has taken composite construction to an entirely new level with the current generation of the BMW 7 Series.

Most recently, more than half a billion euros were invested in the plant's highly efficient production structures and technologies in the past three ye-



ars, among other things to enable the application of CFRP structural parts for the passenger cell and the increased use of aluminum die casting.

At Plant 2.4, for instance, a new CFRP production hall was established along with an entirely new body-in-white facility for the BMW 7 Series, which offers a unique variety of highly automated bonding and joining techniques.

To increase efficiency, quality and customer orientation even further, BMW Group Plant Dingolfing draws on the potential of digitization in production. Areas of application range from virtual process validation to intelligent, self-controlling systems and advanced robotics, namely the increased use of lightweight robots.

HOW A BMW IS MADE: PRESS SHOP.



Every day, huge steel and aluminum sheet rolls are converted into up to 1.6 million body parts for the Dingolfing plant and the global production network. The Dingolfing press shop is the largest facility of its kind within the BMW Group.

More than 40 press systems produce about 2,500 different parts – from fuel tank caps to side frames, with the sheet thickness ranging from 0.65 to 3 mm.

In the future, two high-speed servo presses for the production of large-scale

body parts will help Dingolfing's press shop to increase its efficiency further and to save resources in production.

The new facilities have a press force of 10,300 tons. To put this figure into perspective: The Eiffel Tower weighs 7,300 tons. The BMW Group has invested a total of over 70 million euros in the building and the press line, which is close to 100 meters long.

Several test units check the impeccable quality of pressed parts – ranging from the visual surface check carried out by workers up to the robot-based measuring procedures in the test room.

PRODUKTPALETTE BMW GROUP WERK DINGOLFING

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BMW 3 SERIES
GRAN TURISMO

4



BMW 4 SERIES
GRAN COUPÉ

5



BMW 5 SERIES SEDAN

BODY SHOP.

At the body shop, approximately 2,000 industrial robots turn the sheet metal parts produced at the press shop into varnishable bodies-in-white.

Up to 600 steel, aluminum and plastics components are combined in an intelligent mix of materials; the joining techniques applied range from welding to adhesive bonding and riveting. The result is a very safe car body, which weighs as little as possible – in keeping with the principle of 'Efficient Dynamics'. Lightweight construction has taken on a whole new dimension with the Carbon Core of the new BMW 7 Series, i.e. the use of carbon fiber structural elements around the passenger cell,



as well as the increased application of aluminum die casting. Designed for the latest joining techniques and combinations of materials, Plant 2.4 has created an entirely new, state-of-the-art body-in-white facility for the BMW 7 Series.

The body shop in Dingolfing is the BMW Group's Competence Center for aluminum. This is why the plant also manufactures bodies-in-white for the Rolls-Royce models in an exclusive small series production.



BMW 5 SERIES
TOURING



BMW 5 SERIES
GRAN TURISMO



BMW ACTIVEHYBRID 5



BMW M5

6



BMW 6 SERIES
CONVERTIBLE

PAINT SHOP.



In the paint shop, the body-in-white is given its color and shine. BMW customers can choose from a range of more than 300 series and special colors.

Step by step, the five functional paint coats are applied on a total of three paint lines. The paint layers are about ten times as thick as a human hair and protect the car body against corrosion and environmental impacts. The Dingolfing paint shop is one of the world's most environmentally friendly facilities: Over the course of the past years, wastewater and solvents were reduced significantly.

Top three colors:

1. Black Sapphire and Black Uni
2. Alpine White
3. Space Grey

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BMW 6 SERIES COUPÉ



BMW 6 SERIES
GRAN COUPÉ



BMW M6 CONVERTIBLE



BMW M6 COUPÉ



BMW M6 GRAN COUPÉ

ASSEMBLY.

In assembly, around 6,000 workers fit the painted car bodies with the equipment selected by the customers; the complete premium vehicle is a three-dimensional puzzle of up to 20,000 parts. About 1,600 BMW cars are created on the two assembly lines every day.

The top priority: customer wishes and customization. For a BMW 7 Series, for instance, there are countless different equipment options. Complexity, flexibility and efficiency are particularly apparent in assembly: Different models of the BMW 5, 6 and 7 Series as well as the BMW 3 Series Gran Turismo and the BMW 4 Series Gran Coupé roll off the same assembly line.



Approximately 600 external and internal suppliers provide the plant with parts. All required parts are always fed to the line in the right sequence (just-in-sequence) and at the right time (just-in-time). Customers can change their orders up to six days prior to the start of assembly.

High ergonomic standards and tools such as handling devices, roll stools and pivot mounts make work steps as easy and ergonomic for workers as possible.



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BMW 7 SERIES SEDAN



BMW 7 SERIES LONG VERSION

QUALITY AND INNOVATION – A FOCUS ON CUSTOMER SATISFACTION.

Skilled workers and state-of-the-art measuring and testing systems ensure that all cars that leave BMW Group Plant Dingolfing are of the premium quality customers expect.

Dimensional accuracy and quality are guaranteed thanks to the in-line measuring systems that are applied from the very beginning and that eliminate the need for in-depth re-evaluations. Depending on the specific requirements, skilled workers and maximum-precision robot measuring systems test the produced parts and vehicles.

In mid-2014, the Dingolfing site commissioned a new short test track; before being dispatched to customers, all cars have to pass the test without reservations.

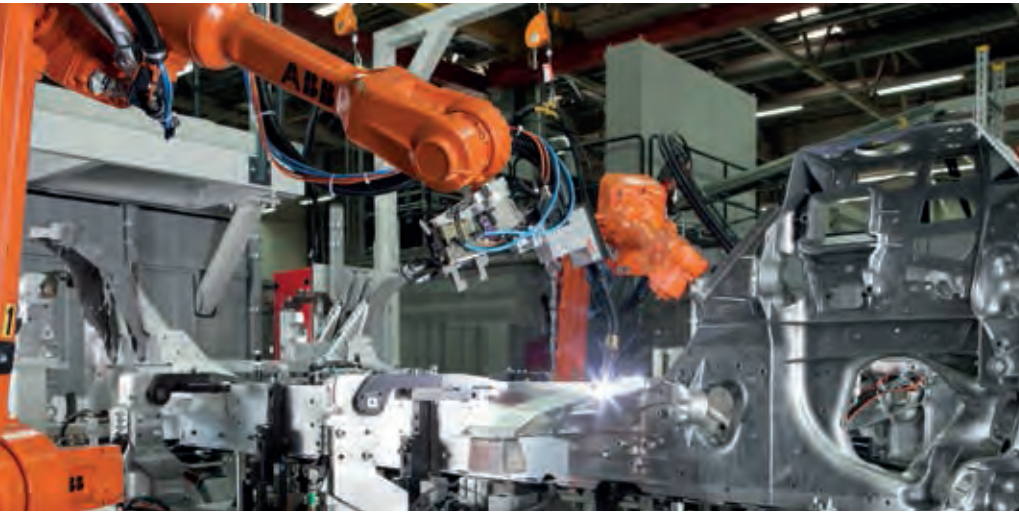
The plant's own Analysis and Special Procedure Center serves as the interface for the Research and Innovation Center (FIZ) in Munich. It ensures the production feasibility of vehicle series as well as the smooth interaction of all electronic infotainment, driver assistance and vehicle systems. It also handles the launch preparation for new models.





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MOBILITY OF TOMORROW FROM BMW GROUP PLANT DINGOLFING.



The era of e-mobility has begun – and BMW Group Plant Dingolfing has a part in it. This is where key components for the BMW i models as well as scopes for the plug-in hybrid models come from.

Plant 02.10, situated right in the center of Dingolfing, makes the high-voltage battery as well as the e-transmission and the Drive structure for the BMW i3.

For the production of the high-voltage batteries, a completely new high-tech production area of over 2,000 square meters was set up. BMW's great expertise is demonstrated in the construction, the design of the cooling system and the high-quality production and assembly process.

In producing the e-transmission, BMW Group Plant Dingolfing benefits from its significant process expertise in the fields of mechanical processing, linking and assembly technologies. The task of the e-transmission is to transfer the power of the e-drive with the respective gear reduction ratio – with as little loss as possible – to the wheels and translate it into a forward motion.

The Drive structure is the 'chassis' of the BMW i3, an aluminum composite frame construction. In assembly of the Drive Module, the battery is integrated and the drivetrain transmission unit fitted. Up to 160 individual parts are assembled by welding robots to form such a Drive structure. The special accomplishment is that a component of this size and complexity with the required dimensional accuracy can ac-

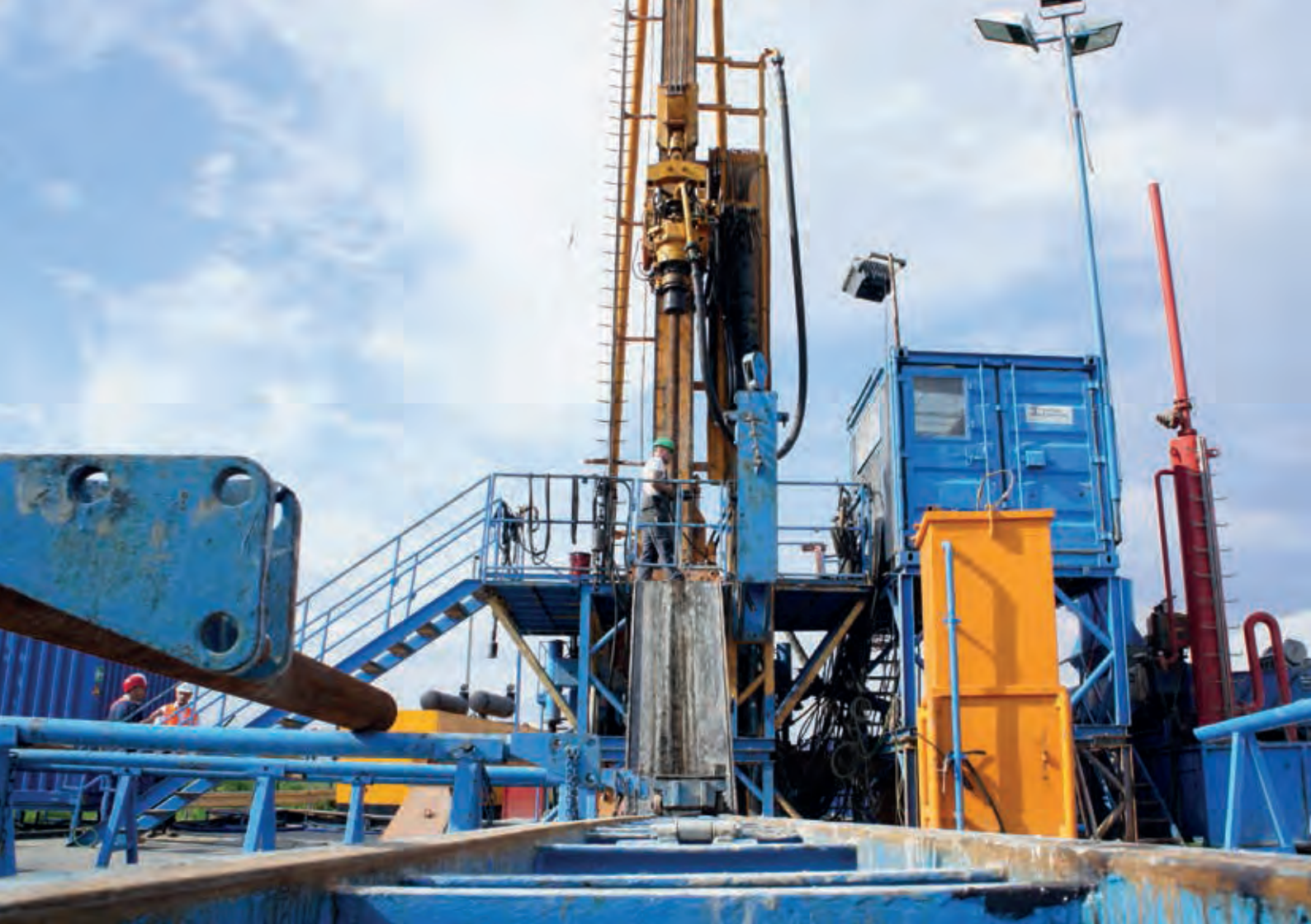
tually be produced in a fully automated process.

But e-mobility made in Dingolfing is not limited to the Component Plant 02.10. As part of the Plant Group 2, a new remote location in Nieder-
viehbach has been created as a production site for chassis and drivetrain components. This is where chassis scopes for the BMW i8 are manufactured, among other things.

Following the launch of the BMW i models, the company is currently working on the transfer of the eDrive technology to the regular model lineup. To this end, production lines for the production of high-voltage batteries and electric motors have been commissioned at Dingolfing's Plant 02.20. This has been the next step in making the site the Center of Excellence for Electro-Mobility. The first models, plug-in hybrid variants of the BMW 2 Series Active Tourer, the BMW 3 Series and the BMW X5, have already been announced or even launched in the market. 2016 will also see the introduction of a plug-in hybrid model for the BMW 7 Series produced in Dingolfing.

Plug-in hybrids are powered by a combustion engine and an electric drive with a high-voltage battery that can be charged at a wall socket. Shorter distances can be covered in electric mode; for longer distances, the cars usually switch to mixed-mode operation.







COMMITTED TO SUSTAINABILITY.

Environmentally friendly production is a top priority for the Dingolfing site. The plant meets its environmental responsibility with activities and investments concerning air purification, resource conservation and energy saving.

The reduction of traffic cuts carbon emissions. With its unique commuter bus system – 300 buses, used by 10,000 employees – the plant makes an important contribution: Compared to people using their own cars to drive to work, the buses account for a reduction in CO₂ emissions of about 7,000 tons annually. Almost 70 percent of all vehicles produced at BMW Group Plant Dingolfing are dispatched by rail, cutting the number of trucks used by 100. On the plant premises, the logistics axle between the press shop and the body shop already omits 70 truck tours a day even though it hasn't been completed yet. There are many aspects to applying environmentally friendly technologies in production: For instance, the Dingolfing paint shop recycles up to 25,000 liters of water per hour and feeds them back into the production process. In the past years, the site has managed to significantly reduce water and energy consumption per vehicle produced. Organic solvent emissions also dropped considerably.

BMW Group Plant Dingolfing applies energy-efficient installations and resource-optimized processes. One of many examples is the innovative ProgDie press technology that has reduced energy consumption by about five million kilowatt hours a year.

The site is also very committed when it comes to recycling: Thanks to the constant efforts to reduce waste for disposal (down 66 percent over the last six years) and to find ways to recycle such waste, the recycling rate in production stands at 99.7 percent.

Since the fall of 2013, the BMW Group has been researching future energy use in Dingolfing. In a federally funded project on aquifer storage at the site, the BMW Group and several cooperation partners evaluate whether it is possible to store heat energy temporarily 400-500 meters underground. Such a seasonal energy storage could save excess energy from the co-generation plant in summer and make it available in winter, thus leading to significant reductions in carbon emissions.

THE HUMAN SUCCESS FACTOR.



Each year, more than 260 apprentices begin their professional training at BMW Group Plant Dingolfing. All in all, the plant is currently training about 800 young people in 13 different professions, such as chemical lab technician, industrial mechanic and materials inspector.

Since the Dingolfing plant opened, it has trained about 10,000 young people. Innovative training concepts, such as the dual apprenticeship with a college entry qualification (DBFH), complement the offering.

In the three-year program, the site trains electronics technicians in industrial engineering, industrial mechanics and automotive mechatronics specialists.

The BMW Group's 'Speed up' program gives graduates the opportunity to follow up on their DBFH program with studies at a partner college.



HEALTHY WORKING, HEALTHY LIVING.

The company is responding to the demographic change with its integrated health management and the 'Today for Tomorrow' project.

The 'Today for Tomorrow' program supports production in aligning itself with the requirements of an aging workforce. Age-appropriate workplaces are created through the introduction of load-optimized workplace rotation as well as a variety of ergonomic measures.

While the company creates ideal working conditions with 'Today for Tomorrow',

the BMW Group's health management ('Initiative Health') focuses on raising people's health awareness and behavior. Attractive offerings in the fields of health promotion and preventive action encourage the workforce to take responsibility for their health – at the workplace and at home.

One example: the numerous health courses at the plant's own physiotherapy, rehabilitation and training center ('PROAKTIV').



A GOOD NEIGHBOR.



BMW Group Plant Dingolfing understands itself as a reliable and important partner for the region of Lower Bavaria. Accordingly, the site focuses on dialogue and commitment to social causes in its activities.

BMW Group Plant Dingolfing has long supported various events, including the Bluetone Festival in Straubing.

The plant also co-hosts the 'Dingfest', a festival that takes place in Dingolfing every two years, and serves as the host of the annual student research competition, 'Jugend forscht – Schüler experimentieren'.

At Neighborhood Days, BMW Group Plant Dingolfing frequently enters into a dialogue with its immediate neighbors. This is how the BMW Group strengthens the location in its role as a good neighbor in the region.



FASCINATION PRODUCTION – EXPERIENCE IT LIVE.

Take a look behind the scenes of the largest member of the BMW Group's production network and visit BMW Group Plant Dingolfing. Tours through the production area are offered to both groups and individuals.

Information and registration at
www.visit-bmw.com





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